DOCUMENT RESUME

ED 336 027 HE 024 847

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TITLE The Legitimacy of Statistical Evidence in Discrimination Lawsuits in the Context of Employment in Higher Education. AIR 1991 Annual Forum Paper.
PUB DATE May 91
NOTE 27p.; Paper presented at the Annual Forum of the Association for Institutional Research (31st, San Francisco, CA, May 26-29, 1991).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Affirmative Action; Court Litigation; Employees; *Equal Opportunities (Jobs); Higher Education; Laws; *Multiple Regression Analysis; Personnel Selection; Promotion (Occupational); *Social Discrimination; *Statistical Analysis
IDENTIFIERS *AIR Forum; *Civil Rights Act 1964 Title VII; Supreme Court

ABSTRACT

This paper examines the use of statistical evidence, specifically regression analysis, in employment discrimination cases on college and university cases. Sections of the paper provide the following: (1) a description of regression analysis focusing on the specific features that make it appropriate for use in discrimination lawsuits; (2) a review of the basic legal principles and other factors which lend legitimacy to the use of statistical evidence in employment discrimination cases; (3) an examination of the status of current law in employment discrimination, including affirmative action, in the context of which statistical evidence is used; and (4) a discussion of the implications of this emerging law for university administrators in general and institutional researchers in particular. Two Supreme Court rulings (Bazemore v. Friday, Watson v. Fort Worth Bank) are noted as addressing the use of statistical techniques. General observations reveal that multiple regression analysis has emerged as the most common statistical technique used to prove the existence or the absence of discrimination in employment decisions. It is noted that the ability of multiple regression analysis to generate various tests for judging the statistical and legal significance of its results renders it a powerful and indispensable tool for the adjudication of Title VII cases in higher education. Forty-three footnotes are attached. (GLR)

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THE LEGITIMACY OF STATISTICAL EVIDENCE IN DISCRIMINATION LAWSUITS IN THE CONTEXT OF EMPLOYMENT IN HIGHER EDUCATION

ED336027

Presented at
The 31st Annual Forum
The Association of Institutional Research
San Francisco, California
May 26-29, 1991

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This paper was presented at the Thirty-First Annual Forum of the Association for Institutional Research held at The Westin St. Francis, San Francisco, California, May 26-29, 1991. This paper was reviewed by the AIR Forum Publications Committee and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC Collection of Forum Papers.

Jean Endo
Chair and Editor
Forum Publications Editorial
Advisory Committee

THE LEGITIMACY OF STATISTICAL EVIDENCE IN DISCRIMINATION LAWSUITS IN THE CONTEXT OF EMPLOYMENT IN HIGHER EDUCATION

I. INTRODUCTION

Most employment discrimination cases are filed under Title VII of the 1964 Civil Rights Act because of its comprehensive coverage. The Act prohibits job discrimination based on race, sex, religion and national origin, and covers decisions on hiring, promotions, terminations and retirements.[1] Title VII applies to all employers, public and private, who employ fifteen or more employees. Over the years, courts have been able to discern that the fundamental purpose of Title VII is to achieve equality of employment opportunity by protecting individuals from disadvantages arising out of their being members of a certain class of people. Combining complex statistical methods with knowledge of the relevant laws covered by the Act has become common in discrimination lawsuits.

Reliance upon statistical methods of proof in discrimination lawsuits is not new. In the field of employment, the demonstration of a disparity, using percentages, between a minority presence in the pool qualified for a position and its representation in the group selected for that position has been a critical step in the establishment of a prima facie case. The leading case in the area is Griggs v. Duke Power Co.[2] The United States Supreme Court declared illegal hiring and promotion practices that have a discriminatory effect, even if employers have no intent to discriminate.

The Multiple regression analysis, which was introduced to the legal community in the 1970s, is emerging as the most common statistical method used to prove the existence or the absence of discrimination in hiring and promotion practices. Its increasing success, as a statical

tool in Title VII cases, lies in its ability to show the effects of several legitimate factors on an employment decision. Its continued use in the context of employment disputes in higher education, as well as elsewhere, presents a new challenge to institutional researchers in their role of linking data/information and decision making.

The purposes of this paper are: (1) to describe regression analysis, as a statistical method, focusing on the specific features that make it appropriate for use in discrimination lawsuits, (2) to review the basic legal principles and other factors which lend legitimacy to the use of statistical evidence, such as multiple regression results, in employment discrimination cases, (3) to describe the status of current law in employment discrimination, including affirmative action, in the context of which statistical evidence is used, and (4) to discuss the implications of this emerging law for university administrators in general and institutional researchers in particular.

II. MULTIPLE REGRESSION ANALYSIS: GENERAL BACKGROUND

Complete explanations of multiple regression analysis are widely available in the literature.[3] The review in this section is limited to the basic concept of the statistical technique focussing on those basic properties that make it useful in discrimination lawsuits.

Multiple regression analysis is a process for estimating the relationships among several variables. More specifically, it is a statistical device for making quantitative estimates of the effects of different factors on some variable of interest. The steps involved in the development of a multiple regression model are as follows:

Step 1. Identify a dependent variable and independent variables. The dependent variable is that variable of interest which needs to be explained; for example, employee salary. The independent variables are factors used to explain the variable of interest. For example, experience, level of education, race, sex, and position title can explain employee salary.

Choosing the set of independent variables presents two major problematic questions:

First, Which of the many possible factors should be included? The type and number of variables included in a regression model and the accuracy of their quantification are often the source of controversy between parties in a lawsuit.[4] The choice of the explanatory variables must stem from a sound theory, and more importantly, common sense. Nowadays, there may even be lists of variables which have been shown to influence wages from which one can choose those variables that are appropriate for the facts and circumstances of the particular case.[5] One does not have to exhaust all possible factors. The common strategy followed is to start with the significant ones and stop when you reach a point where additional factors will not add anymore explanation.

Second, In what mathematical form should each independent variable be specified? stated differently, what are the mathematical assumptions about how the independent variables affect the dependent variable? For example, the effect of number of years of college education on salary should be positive but, at some point, each additional year of education increases salaries less than the one before. Typically, especially where a set of explanatory factors has been carefully established, estimations using the data in the form in which they are observed should be adequate. In other words, one would consider the factors just as they are empirically determined.

Step 2. Collect Data on Variables. Data on the factor to be explained (dependent variable) and the postulated explaining factors (independent variables) have to be collected by taking observations from a relevant population. Some data may be readily available from personnel files, some may not, depending on the fact situation in the case.

Step 3. Run the Regression for Results. Nowadays, calculation of regression results is accomplished electronically by using available computer program packages.[6]

In its simplest form, a regression analysis is commonly represented by the mathematical equation:

$$Y = a + bx$$

The equation assumes the dependent variable, Y, is explainable by only one independent variable, X; and the relationship between the two variables is a straight line. The "b" in that equation is a "coefficient" calculated from the data. It indicates the quantitative association between the independent variable, X and the dependent variable, Y. This coefficient, as will be discussed further, is a very important feature which makes regression analysis the favored technique in employment discrimination litigations.

In practice, one does not usually work with relationships involving only two variables. The common practice is to develop a regression equation in which a dependent variable is influenced by many independent variables; thus, the name "multiple regression". For example, a situation where a dependent variable is explainable by three independent variabless can be represented by the equation:

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + u.$$

In this equation, Y is the dependent variable, X_1, X_2 and X_3 are the independent variables, and "u" is the residual difference unexplained by the three variables in the equation.

To concretize the above-stated equation, suppose we are dealing with the case of a school which employs 50 teachers, the majority of whom are white, but some are black. We are interested in teacher salary, and want to estimate how (1) experience, (2) level of education and (3) race, affect teacher salary. We collect data on all 50 teachers and run a regression. Suppose we obtain the following results:

Teacher Salary = \$5,000 + \$700(Yrs. of Service) + \$900(Yrs. in Coll.)

- \$650(1 if black, 0 if white).

The verbal interpretation of the equation is; All teachers' salaries progress in increments of \$700 for every year of teaching and \$900 for every year of college education. However, on average, blacks receive \$650 less in salary than do whites at any given level of experience and education. Herein lies the attractiveness of regression results.

The purpose of filing a discrimination lawsuit under Title VII is to first, establish that an employer's decision has disadvantaged the person filing the suit because of that person's membership in one of the population classes protected by Title VII. Assuming that the results of the regression equation in our hypothetical example pass conventional statistical significance tests, the negative relationship between being black and salary, as indicated by the coefficient of minus $650, forms a basis for finding racial discrimination. This is not to say that regression results alone can provide conclusive evidence of the existence of discrimination. Anecdotal evidence obtained from witnesses is often needed to supplement regression results.[7]

Once violation of Title VII is proven, the second purpose of the lawsuit is to obtain remedy for the damage caused by the violation. Section 706(g) of Title VII grants courts the authority to fashion the most complete relief possible to remedy the proven violation. The remedy should place the victim of discrimination in the situation he or she would have been in the absence discrimination. The $650 in our hypothetical example can become a concrete basis for awarding the appropriate remedy.

III. FACTORS WHICH LEND LEGITIMACY TO THE USE OF MULTIPLE REGRESSION RESULTS

The multiple regression analysis has emerged as the most common statistical method used to prove the existence or the absence of discrimination in hiring and promotion practices. There are several legal principles and other factors which lend legitimacy to the use of multiple regression results in employment discrimination litigations. The most significant ones are discussed in the following sections.

A. Posture of the Court: "Strict Scrutiny" if Victim is Member of "Suspect Class"

The "posture of the court" is a reference to the general disposition of the United States Supreme Court in adjudicating lawsuits involving discrimination. Given the remedial purpose of Title VII and open discrimination in the history of this country, it is reasonable to expect courts to

apply Title VII laws liberally. Traditionally, the Supreme Court has applied the standard of "strict scrutiny" if the alleged victim of discrimination is a member of a "suspect class." This means, one can expect the court to strictly scrutinize defendant employer's actions (especially if the employer is a governmental agency) against members of a group which the court characterizes as "suspect class."

To be considered a "suspect class," a group must be discrete, immutable and insular. "Discrete" is a reference to being easily delimited and identified--may be physically identifiable. "Immutable" is used to describe a sense of inability to escape a given classification; if you are black, you stay black; if you are a woman, you stay a woman. "Insular" suggests isolation and describes a situation of restricted interaction with the majority.

A racial minority group more or less meets the three criteria. For example, African-Americans, as a group, comprise a suspect class. On the other hand, women as a group, *do not* comprise a suspect class because they do not meet "insularity" criterion of the three-element test. Nonetheless, gender has received what has come to be known as a "heightened scrutiny", which is still high but short of "strict." Thus, strict scrutiny is usually applied in cases involving the suspect classifications of race, national origin, and ethnic discrimination while less rigorous tests are applied in sex discrimination cases.

Title VII, as previously stated, is the most common basis for employment dicrimination lawsuits; and because most of the lawsuits are filed by racial minorities and women, the courts' tradition of applying either "strict" or "heightened" scrutiny favors the use of regression or similar quantitative technique as evidentiary tools. The effect of this posture is reflected in the way courts allocate the burden of proof between the parties in the case, and in the degree of certainty of the evidence they require.

B. Allocation of Burden of Proof

To facilitate decisions and to cope with the factual uncertainties, the law of evidence

imposes on one or another party the burden of proof. The philosophical grounds and policy justifications for allocating the burden of proving the truthfulness or falsity of what is contested in a case is beyond the scope of this paper.[8] For the purpose of this paper, it will suffice to indicate how the burden of producing proof is allocated in a typical Title VII case. The plaintiff, the party who files the suit alleging discrimination, carries the burden of presenting evidence that is sufficient enough to support a prima facie case. That is, he or she must convince the court that it is more likely than not that discrimination has occured. This burden can be met by offering statistics, such as multiple regression results, which show that members of the protected class are in a less favorable position than other comparably qualified persons.

Once the plaintiff has established a prima facie case, the burden shifts to the defendant employer to show that the allegations are not true, and that there has not been a violation of law in its personnel practices. The defendant can do this either by directly challenging the plaintiff's evidence on methodological and substantive grounds, or by offering a legitimate nondiscriminatory explanation for the observed disparity.

If defendant employer convinces the court of the "business necessity" of its challenged business practice, then the burden of proof shifts back to the plaintiff to show that a less discriminatory alternative practice exists which would meet the employer's legitimate goals without producing an adverse effect on the protected class.[9]

C. The Required Degree of Certainty of the Evidence

Closely related to the allocation of a burden of proof is the factual certainty of the evidence presented by the party carrying the burden. In any legal dispute, some uncertainty is likely to remain. The important question to ask is, What degree of certainty is the court willing to accept?

Commonly heard in legal proceedings are expressions such as, "fair preponderance of the evidence," "clear and convincing evidence," and "proof beyond reasonable doubt" or their

equivalencies. If given a scale of certainty, ranging from 0% to 100%, one would intuitively be able to place the above-stated three degrees of certainty on that scale as shown in Figure 1.

Scale of Certainty

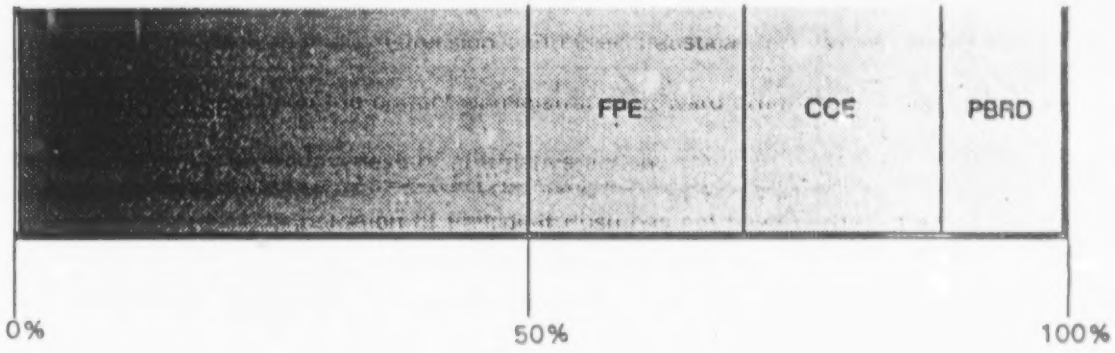

Figure 1

The standard of "proof beyond reasonable doubt" is exclusively reserved for criminal cases and thus not applicable to Title VII cases. In Title VII employment scrimination cases, the degree of certainty of the evidence courts require in order for the plaintiff to establish a prima facie case is the "fair preponderance of the evidence." Stated differently, all the claimant needs to show is that it is more likely than not that employer discriminated against him or her in its employment practices. This requirement obviously favors the use of regression analysis results.

The degree of certainty required of defendant employer remains unclear. Courts, in most cases, had been applying the more stringent standard of "clear and convincing evidence" in requiring defendant employers in their rebuttal of plaintiff employees' prima facie evidence. However, in a 1989 case, Price Waterhouse v. Hopkins,[10] the Supreme Court has rejected the requirement of "clear and convincing" standard on the ground that discrimination cases do not fall within the rare category of civil cases providing for an "unusual coersive action" remedy.[11] This ruling implies that the standard a defendant employer has to meet in offering its evidence is

"preponderance of evidence." Thus, defendant employers can use multiple regression results as effectively as plaintiff employees.

D. Multiple Regression's Technical Self-Tests

Multiple regression results are useful in Title VII litigations only if they are applied properly, can pass conventional statistical tests and can withstand legal scrutiny. An expert in the the application of statistical techniques to legal problems stated, "In the legal context, multiple regression is both a Mecca and a minefield."[12] Fortunately, the multiple regression model embodies within itself technical tests which can indicate to the user how well the model will sustain scientific as well as legal scrutiny. Two tests are most commonly used.

1. The Coefficient of Multiple Determination (R^2).[13] The R^2 measures the percentage of the variation of the dependent variable that is explained by the independent variables in the regression equation. It indicates how well the model represents reality, and is thus commonly described as the measure of "goodness of fit." The R^2 ranges from 0 to 100%, and the higher its value, the greater the association between movements in the dependent variable and independent variables.

2. Standard Error of Coefficient and t-Statistic. Associated with each regression coefficient calculated in the equation is the standard error of coefficient, which measures the coefficient's reliability. In general, the larger the standard error, the less reliable or less accurate is the estimated value of the coefficient. Conventionally, the standard error of coefficient is expressed in terms of a "t test," which indicates how much mere chance had to do with the predicted value. The "t-test" is then translated into "significance levels." Sinificance levels of five percent and one percent are generally used by statisticians in testing hypotheses, and thus can be expected to meet the legal sufficiency requirement . That means, given a significance level of five percent (or one percent), it is safe to assume that the true coefficient is not zero and therefore the variable being tested has some effect on the dependent variable.[14]

The availability of such tests enables the user of multiple regression analysis in a lawsuit to make a reasonable judgement on the appropriateness of the regression results for the specific facts and circumstances of the case in question. Moreover, in the legal proceedings, the evidence presented in the form of regression results and the statistical tests will be subject to scrutiny by opposing attorneys and their expert witnesses.

E. Growing Support from the Legal Community

In the literature, the first suggestion for the use multiple regression models in employment discrimination cases surfaced in 1975 in the Harvard Law Review.[15] A note in that publication outlined the basic features of the technique and its predictive ability, which the note linked to the establishment of damages. People filing lawsuits began introducing regression studies to support their cases, and with defendants usually responding with counterstudies.

Since the suggestion by the Harvard Law Review note, regression analysis seems to have caught on. Prominent statisticians and econometricians, who had been called upon to perform studies and testify in regulatory proceedings also joined the bandwagon. For example, Franklin Fisher, in a Columbia Law Review article, stated that multiple regression studies have been commonly used in regulatory proceedings and that he saw no reason why multiple regression should not be used in litigation situations as well.[16] He urged lawyers to familiarize themselves with the technique because they are likely to find themselves either in a position where it will be profitable for them to use it or where they must confront a regression study produced by an opponent.[17]

With the increasing prominence of multiple regression analysis, the legal community is becoming more familiar with of the evidentiary value of the statistical technique. More importantly, the case law, specific to the subject of the application of regression anlysis, has provided some guidelines.

F. Supreme Court Rulings Specific to the Use of Statistical Techniques

Perhaps the single most important factor that lends legitimacy to the use of statistical techniques in employment discrimination lawsuits is the case law established through the United States Supreme Court rulings. There are two cases in which the Supreme Court considered multiple regression statistics in the context of employment discrimination litigations.

1. Bazemore v. Friday.[18] The most succinct statement on the use of multiple regression analysis was expressed by Justice Brennan in the case, Bazemore v. Friday, in which black employees of the Extension Services of the University of North Carolina brought a suit under Title VII claiming racial discrimination in the unit's employment practices. The case itself is very complex; it involved many parties and several issues. However, the issue related to the application of multiple regression as a proof of discrimination was straightforward.

The plaintiffs had presented a regression study using as variables race, education, tenure, and job title. The regression results showed blacks were paid less than similarly situated whites by about $331 per year. The trial court rejected the study stating that the model did not include all measurable variables thought to have an effect on salary level. To the trial court the study presented by the plaintiffs was unacceptable as evidence of discrimination. The Court of Appeals agreed with the trial court and upheld the decision. But the US Supreme Court reversed, and Justice Brennan, writing for the unanimous court, stated:

> "While the omission of variables from a regression analysis may render the analysis less probative than it otherwise might be, it can hardly be said ... that an analysis which accounts for the major factors 'must be considered unacceptable as evidence of discrimination.'"[19]

Justice Brennan further stated:

> "Importantly, it is clear that a regression analysis that includes less than 'all measurable

variables' may serve to prove a plaintiff's case. A plaintiff in a Title VII suit need not prove discrimination with scientific certainty; rather, his or her burden is to prove discrimination by a preponderance of the evidence."[20]

Commentators interpreted the Bazemore decision as the Supreme Court's clear respect for the evidentiary value of multiple regression analysis, which will lead to increased reliance on this statistical technique in Title VII cases.[21]

2. Watson v. Fort Worth Bank.[22] In this case, a black female employee filed a suit claiming that defendant employer, Fort Worth Bank, adversely affected the promotional opportunities of its black employees by its subjective selection system. She presented statistical evidence to prove her claim, to which defendant employer objected. The Supreme Court, in a unanimous vote, declared that statistical evidence about the effects of employer's personnel policies could be used as part of an effort to prove discrimination. What is even more significant is the Court's ruling that the statistical evidence could be a proof regardless of whether or not the employer intended to discriminate. Justice O'Connor wrote that the use of statistical comparisons is "no less applicable to subjective employment criteria than to objective or standardized tests."[23] Again, commentators predicted this ruling will likely spur more litigation.[24]

Generally, the case law established by both Basemore and by Watson undoubtedly provides more encouragement to people who experience employment discrimination. Consequently, we may indeed see an increase in the number of Title VII litigations in higher education.

IV. STATUS OF CURRENT LAW IN EMPLOYMENT DISCRIMINATION

The law in the area of employment discrimination, including affirmative action, is vast and complex. It is next to impossible to exhaust the existing body of law in a paper of limited scope as this one is. The purpose here is to merely state, in general terms, the discernable rules in the context of which multiple regression and other statistical results are used. But, a brief statement on the disposition the current administration toward affirmative action is in order, as it has a bearing on the effectiveness of affirmative action.

The current adminstration of President Bush has not been portrayed as a promoter of affirmative action. The presidential veto of a 1990 amendment to the Civil Rights Act has earned President Nixon disfavor from supporters and promoters of affirmative action. More importantly, his recent appointments of judges to the Supreme Court has given the President an opportunity to substantially change the composition of the highest court in the nation, a trend which was started by the Reagan administration. Commentators have concluded that the United States Supreme Court now has a conservative majority whose rulings could adversely affect the cause of affirmative action.[25]

It is the decisions of the nations highest court, rather than the posture of the administration, which determines the law of affirmative action. Following is a brief outline describing the current status of that law.

A. Strict Scrutiny if Victim Is a Member of Suspect Class

The Court's tradition of strictly scrutinizing an employer's action, where the action allegedly adversely affects a member of a "suspect class," is the basic underlying context in Title VII litigation. The meaning has already been described in Part Three.

B. Racial Quota Is Unacceptable, But Race as a Factor Is Acceptable

To reserve a specified number of openings/positions for a racial group in order to promote affirmative action has been declared by the Supreme Court as unconstitutional, violative

of the Equal Protection Clause of the Fourteenth Amendment. This decision was handed down in the famous case, Regents of the University of California v. Bakke.[26] Bakke, a white applicant who was denied admission to a medical school, filed his action under the Equal Protection Clause of the Fourteenth Amendment. To emphasize the illegality of quota, Justice Powell in a majority opinion wrote, "No state shall ... deny to any person within its jurisdiction the equal protection of the law."[27]. However, in the same case, the Court also ruled that race may be considered as a factor in evaluating applicants for admission, employment and other personnel actions.

C. Diversity is a Good Policy, but Role Model is Doubtful

Promoting educational diversity has generally been viewed favorably by the majority of the United States Supreme Court justices as consistent with the overall goals and missions of higher education. For example, in his opinion for the majority in the Bakke case, Justice Powell stated that "the attainment of diverse student body ... clearly is constantly permissible goal for an institution of higher education."[28] In another case, specific to higher education setting, Justice Stevens expressed support for university decisions that seek to create and maintain a multi-ethnic teaching faculty.[29]

Institutions of higher education have taken notice of the legally favorable nature of the goal of diversity and have been incorporating that notion in their affirmative action policies and plans. For example, the University of Wisconsin System's affirmative action plan was appropriately entitled "Design for Diversity."[30]

The concept of role model, which educational institutions often cite as an important justification for their affirmative action policies, however, has been rejected by the majority of the Supreme Court justices.[31]

D. Remedying Underrepresentation Is a Good Social Policy

In a 1987 case, Johnson v. Santa Clara County Transportation Agency,[32] the Supreme Court confirmed the validity of voluntary affirmative action plan under which employers may take

into account the race and sex of a candidate as a factor in employment or promotion decision. In that case, the Court justified the employer's affirmative action because of the existence of what the court termed as a "manifest imbalance" in the employer's job classification and therefore, the plan was to remedy underrepresentation. The Court added that an employer need not prove that it had discriminated in the past in order to adopt such a plan.

The key phrase in that decision was, "manifest imbalance." The Court did not elaborate what constitutes a manifest imbalance, but one can sense that the concept is amenable to quantification and statistical analysis, including the regression method.

E. Voluntary Affirmative action Is a Good Policy

In cases such as Johnson, the Supreme Court has declared that voluntary affirmative action plans, which take into account race or sex as a factor in employment decisions, are legal. Beyond the question of legality, universities voluntarily initiate and implement affirmative action plans for moral reasons and in respond to social pressures. For example, the previously mentioned University of Wisconsin System's 1988 affirmative action plan, "Design for Diversity," was preceded by studies which concluded that the System's performance in attracting and retaining minority students and faculty during the previous decade was unsatisfactory. The Design for Diversity provided a comprehensive systemwide strategy for increased diversity on all campuses within the System.[33]

The process of implementing voluntary affirmative action plans has the potential for causing lawsuits of the type that has come to be known as "reverse discrimination."

F. "Reverse Discrimination"

The phrase, "reverse discrimination" has been used to describe lawsuits brought by non-minority individuals or groups against an employer over the latter's actions which purportedly advance the cause of affirmative action. Some writers have commented that reverse discrimination emerged in reaction to the courts' interpretations of Title VII and the Equal

Employment Opportunity Commission's enforcement powers granted by Title VII itself.[34]

Reverse-discrimination type lawsuits are usually filed under the Equal Protection Clause of the Fourteenth Amendment. The previously mentioned two cases, Johnson and Wygant were of such a nature. The outcome of reverse discrimination lawsuits will depend on the specific facts and circumstances of each case. But the following generalizations can be appropriately made: First, it is unlikely that the court will strictly scrutinize the employer's personnel actions, as it would when the alleged victim is, for example, a member of an ethnic minority. Second, it follows that the burden of proof, and the attendant degree of certainty of the evidence presented, may tend to be heavier on the reverse-discrimination claimant. Third, and final, the court will most likely compare the alleged victim's adverse effect with the social goal furthered by the employer's action.[35] That means, in order to win, the party filing the suit must prove that the employer's action "trammels" his/her rights.[36]

The above-outlined rules by no means exhaust the current status of employment discrimination and affirmative action laws. But they sufficiently indicate that the law in general provides a favorable context for the use of statistical evidence.

V. IMPLICATIONS FOR UNIVERSITY ADMINISTRATORS AND INSTITUTIONAL RESEARCHERS

In Part Three, we saw that case law and a few other factors support the use of multiple regression results as evidence in Title VII litigations. In Part Four, we concluded that current employment discrimination and affirmative action laws provide a generally favorable context for the use of statistical evidence. As lawyers, judges and other members of the legal community continue to familiarize themselves with the evidentiary potential of regression results, we can expect increased application of multiple regression analysis in emplyment disputes in higher education. What are the implications of this development for higher education administrators in

general and institutional researchers in particular?

A. Implication for University Administrators in General

1. Academic Shield Is Vulnerable. Traditionally, courts have been reluctant to be involved in decisions of higher education institutions on questions which are academic in nature. This tendency is referred to in the literature as "the doctrine of judicial deference." One of the more succinct expressions of this tendency is found in a Supreme Court opinion which cautions that "judges ... asked to review the substances of a genuine academic decision ... should show great respect for the faculty's professional judgement."[37] Courts feel they lack the expertise needed to make sound judgements in purely academic issues, such as student evaluation and faculty tenure. The doctrine of judicial deference of academic questions to the academia will probably continue, but not without some limitations.

First, It should be noted that when Title VII was originally enacted in 1964, it exempted educational institutions with respect to employment of individuals in their educational activities. Congress elimiated that exemption when it amended the Act in 1972. The Supreme Court has interpreted the extension of Title VII to educational institutions as "Congress' considered response to the widespread and compelling problem of invidious discrimination in educational institutions."[38] Second, there will always be some cases which pit academic freedom against other desirable social goals, in which situation the court will have to weigh the importance of the competing goals involved rather than deferring the decision to the academia. We recall the University of Georgia case in which a woman faculty member sued for sex discrimination in the denial of her tenure. It was a case in which academic freedom was pitted against gender equality. Apparently the court tilted in favor of gender equality when it ordered one of the male tenure reviewers to reveal the basis of his voting. He appeared in court clad in his academic gown to protest the court order as an intrusion into academic freedom. In a more recent University of Pennsylvania case, the Supreme case concluded that a university's academic freedom interest in

maintaining confidentiality of peer review must give way to an alleged discrimination victim's right to obtain necessary evidence.[39]

Third, the university campus, as described by W. E. Vandament, is " a place of multiple enterprises."[40] The multi-functional nature of the university leaves many activities which cannot be legitimately described as academic in nature. It has not been in the tradition of the courts to defer to the academic decision-maker the resolution of disputes that occur in those areas.

2. Heightened Awareness of Personnel Policies and Procedures. The possibility of increased discrimination lawsuits spurred by statistical evidence requires that university administrators exercise extreme caution in their personnel actions. Particularly important are an institution's own personnel rules and policy guidelines. Institutions are held responsible to their own substantive or procedural rules. Such rules should therefore be carefully drafted making sure they are clear and consistent with existing laws related to employment.

It was previously stated that universities initiate affirmative action plans to increase participation of underrepresented segments of the population. An awareness of the latest developments in affirmative action laws in the drafting and actual implementing of those plans enables university administrators to minimize the reverse-discrimination types of lawsuits.

3. Identify Potential Litigation Areas and Take Preventive Measures. Higher education administrators need to identify areas of potential litigation and develop preventive measures and programs for their institutions. There are already indications that employment-related cases are on the rise. For example, Lelia Helms, in a 1988 study found that of 431 cases involving postsecondary institutions, 175 (40.6%) were related to employment problems, forming the largest category of cases in higher education that year.[41] Although no similar prior national level data existed for comparison, the author inferred from trends in some states, that there has been some growth in litigation in employment issues due to the expansions of laws and regulating aspects of the conditions of employment.[42]

Multiple regression analysis and other statistical techniques can be used by university administrators to voluntarily monitor and correct internal pay discrepancies, the same way courts use it to calculate remedy awards. This way not only can administrators maintain fairness in their personnel practices but also prevent costly litigations.

B. Implications for Institutional Researchers

The advent of multiple regression analysis and other statistical techniques in employment litigations impacts institutional researchers in their role of linking data/information and decision making in higher education institutions.

1. Source and Appropriateness of Data. The institutional researcher may or may not be the custodian of institutional data. But, the institutional researcher is probably the person who is capable of determining the appropriateness of a given set of personnel data for a given purpose. For example, if faculty data are needed to run a regression equation whose results can be used for evidenciary purposes in a litigation, one needs to determine whether to use headcount or full-time equivalent, ranked faculty only or all teaching staff, including or excluding research faculty, including or excluding student assistants, including or excluding people on leave, etc. And who is in a better position than the institutional researcher to assist the litigator to make these judgements?

Availability of appropriate personnel data in an institution is important for two reasons. First, the legal procedural requirement of "discovery" entitles the employee, who files a Title VII lawsuit, to obtain from the defendant employer the data he or she needs for a regression equation or other statistical techniques the employee may want to use. Second, the employer defendant may need to develop its own regression equations either to counter a palintiff employee's evidence or to independently prove non-discrimination. Whichever the reason, the availability of appropriate data could mean a difference between winning and losing a case.

2. Review of Regression Models. Suppose an employee has filed a lawsuit against a university claiming discrimination on the basis of race or sex in violation of Title VII; and suppose that the employee has offered results of a regression analysis, which the court could interpreted as evidence of discrimination. The first step the university's attorney will take is, obtain an expert opinion. The in-house expert is likely to be the institutional researcher. Even if the case is of such a nature that it requires advice from outside expert in statistics or econometrics, the institutional researcher is the likely candidate to help out in the initial evaluation of the statistical evidence prepared by the suing employee.

3. Development of Employer's Own Regression Models. The institutional researchers may be asked by university administrators to develop regression models for the university when faced with a Title VII lawsuit. Whether or not the defendant develops its own regression models and presents results either to counter plaintiff employee's models or to independently prove the absence of discrimination, can be critical to the outcome of a case.

In the Bazemore case,[43] in which the plaintiff employees won by presenting regression results, the Supreme Court took notice of the fact that the defendant employer's strategy was to merely declare that many factors go into determining individual employee's salary; the employer did not present any statistical or other kind of evidence to demonstrate there was no disparity between salaries of blacks and whites. The implication was that the employer should have presented its own statistics to counter those of the employees.

As the suing employee can use regression analysis to prove the existence of discrimination, so can the defendant employer use the same technique prove the existence of non-discrimination. Thus, the institutional researcher's support service in this area can become very important.

VII. SUMMARY AND CONCLUSIONS

Title VII of the Civil Rights Act, originally enacted in 1964 and subsequently amended by Congress, is the most comprehensive act on employment discrimination. Its purpose is to achieve equality of employment opportunity in the nation. Title VII prohibits job discrimination based on race, sex, religion and national origin. Most employment discrimination cases are filed under Title VII.

Multiple regression analysis has emerged as the most common statistical technique used to prove the existence or the absence of discrimination in employment decisions. This is not to say that regression results alone can provide a conclusive evidence of the presence or absence of discrimination; but, that in conjunction with anecdotal evidence obtained from witnesses, they may enable courts move closer to discovering the truth.

The ability of multiple regression analysis to generate various tests for judging the statistical and legal significance of its results, combined with various substantive and procedural legal principles which support its application, render the statistical technique a powerful and even an indispensable tool for the adjudication of Title VII cases in higher education.

Educators and university administrators in general should be mindful of this development in their personnel actions. This new development is particularly significant to institutional researchers as it presents them with new challenges in their role of liking information and decision making in higher education.

NOTES

1. The key substantive provision of Title VII is Section 703(a) which provides:

> It shall be an unlawful employment practice for an employer-- (1) to fail or refuse to hire or to discharge any individual, or otherwise to discriminate against any individual with respect to his compensation, terms, conditions, or priviledges of employment, because of such individual's race, color, religion, sex, or national origin; or (2) to limit, segregate, or classify his employees or applicants for employment in any way which would deprive or tend deprive any individual of employment opportunities or otherwise affect his status as an employee, because of such individual's race, color, religion, sex, or national origin.

42 U.S.C. Sec. 2000e-2(a) (1982).

2. 401 U.S. 424 (1971).

3. See, e.g., F.M. Fisher, Multiple Regression in Legal Proceedings, 80 COLUMBIA LAW REVIEW 702 (1980); D.W. Barnes, A Common Sense Approach to Understanding Statistical Evidence, 21 SAN DIEGO LAW REVIEW 809 (1984); M.O. Finkelstein, The Judicial Reception of Multiple Regression Studies in Race and Sex Discrimination Cases, 80 COLUMBIA LAW REVIEW 737 (1980).

4. Typically, a defendant employer argues that job level, which is the rank of an employee within the employer's workforce, should be included in a regression model. Plaintiff employees argue that such a variable is "tainted" because it is a result of employer's past decisions and thus, conceals the effects of employer's discrimination. See generally, Note, Title VII Multiple Linear Regression Models and the Courts: An Analysis, 46 LAW AND CONTEMPORARY PROBLEMS 283 (1983).

5. See, e.g., J.KOCH & J.CHIZMAR, THE ECONOMICS OF AFFIRMATIVE ACTION (1976); T. PEZZULLO & B. BRITTINGHAM, SALARY EQUITY (1979).

6. For example, the software package, Statistical Package for the Social Sciences (SPSS), includes a regression program that is commonly used.

7. For a detailed discussion of the limitations of regression results as evidence in Title VII cases, see generally, W. Fogel, Class Pay Discrimination and Multiple Regression, 65 NEBRASKA LAW REVIEW 289 (1986).

8. For a brief discussion of the philosophical basis of allocating burden of proof, see generally, D. H. Kaye, Statistical significance and the Burden of Persuasion, 46 LAW AND CONTEMPORARY PROBLEMS 13 (1983).

9. For a detailed discussion of the allocation of burden of proof and the steps involved in Title VII cases, see B. A. Norris, Multiple Regression Analysis in Title VII Cases: A Structural Approach to Attacks of "Missing Factors" and "Pre-Act Discrimination," 49 LAW AND CONTEMPORARY PROBLEMS 66-80 (1986).

10. 109 S. Ct. 1775 (1989).

11. id. at 1792-93.

12. B. A. Norris, supra note 9, at 63.

13. It is also known as "The Squared Multiple Correlation Coefficient."

14. For a detailed explanation of standard error of coefficient and related statistical tests, see F. M. Fisher, Multiple Regression in Legal Proceedings, 80 COLUMBIA LAW REVIEW 716-20 (1980).

15. 89 HARVARD LAW REVIEW 387 (1975).

16. F.M. Fisher is a nationally reknowned econometrician from Massachussettes Institute of Technology (MIT). He expressed his views in an article, Multiple Regression in Legal Proceedings, 80 COLUMBIA LAW REVIEW 702 (1980).

17. id. at 736.

18. 106 S. Ct. 3000 (1986) (per curiam).

19. id. at 3009.

20. id. (emphasis added).

21. B. A. Norris, supra note 9, at 96.

22. 108 S. Ct. 2277 (1988).

23. id. at 2786. Some scholars argue that Wards Cove Packing Co. v. Antonio (109 S.Ct. 2115 (1989), a case decided after Watson, has eroded the latter's impact. In Wards Cove, the Court ruled that precise proof of high level impact is necessary to establish a prima facie case.

24. A Chronicle of Higher education articles on the case was entitled, "Supreme Court Ruling May Make It Easier for Faculty Members to Win Bias Lawsuits." (July 6, 1988) at 1.

25. See, e.g., R. Belton, Causation and Burden-Shifting Doctrine in Employment Discrimination Law Revisited: Some Thoughts on Hopkins and Wards Cove, 64 TULANE LAW REVIEW 1359 (1990). According to Belton, recent cases, such as Price Waterhouse v. Hopkin (109 S. Ct. 1775 (1989)) and Wards Cove Packing Co. v. Antonio (109 S. Ct. 2115 (1989), reflect the socio-economic and political predilections of the majority of the Court. Through burden-shifting rules and evidentiary standard requirements, the court reached decisions that could undermine the cause of affirmative action. id. at 1364. See also L. Green, Race in the 21st Century: Equality Through Law? 64 TULANE LAW REVIEW 1515 (1990).

26. 438 U.S. 265 (1978).

27. id. at 289-90.

28. id. at 311-12.

29. Wygant v. Jackson Board of Education, 106 S. Ct. 1842 (1986).

30. The University of Wisconsin System, Design for Diversity, a report to the Board of Regents by President K. A. Shaw, April 7, 1988.

31. See generally, Wygant, supra note 29.

32. 107 S. Ct. 1442 (1987).

33. The University of Wisconsin System is comprised of two doctoral research universities, eleven comprehensive universities and thirteen freshman/sophomore centers. The System's institutions themselves have drawn affirmative action plans specific to their own situations. Prominent among them is University of Wisonsin-Madison's "Madison Plan," which has attracted national attention.

34. See, e.g., M. Schiff, Reverse Discrimination Re-Defined As Equal Protection: The Orwellian Nightmare in the Enforcement of Civil Rights Laws, 8 HARVARD JOURNAL OF LAW AND PUBLIC POLICY 627 (1985).

35. The legal phrase used to describe the comparison is "balancing test."

36. The "trammel" standard was expressed by Justice Brennan, for the majority opinion, in United Steelworkers of America V. Weber, 443 U.S. 193 (1979). Referring to United Steelworkers race-conscious affirmative action plan, he stated that the plan "does not unnecessarily trammel the interests of white employees," and thus, is a justified measure to eliminate a manifest imbalance. id. at 208.

37. Regents of University of Michigan v. Ewing, 474 U.S. 214 (1985), at 255.

38. University of Pennsylvania, Petitioner v. Equal Employment Opportunity Commission, 110 S. Ct. 577 (1990), reported in 54 U.S. LAW WEEK 4093 (1990).

39. id., 110 S. Ct. 577 (1990).

40. W. E. VANDEMENT, MANAGING MONEY IN HIGHER EDUCATION (A Guide to the Financial Process and Effective Participation Within It). intro. (1989).

41. L. Helms, Litigation Patterns: Higher Education and the Courts in 1988, 57 EDUCATION LAW REPORTER 1 (Jan 18, 1990).

42. id. at 7-8.

43. See supra note 18.